

REMARKS

In view of the above amendments and the comments which follow, and pursuant to 37 C.F.R. § 1.114, reconsideration of the Official Action of June 30, 2004 is respectfully requested by Applicants.

Summary

Claims 1 – 18 stand rejected. Claims 1, 3, 8, 10, 11, 12, 13, 14, and 16 -18 have been amended. The amendments find support in the specification. As such, no new matter has been introduced as a result of these amendments.

Claims 1 – 18 are pending following entry of the response.

Rejections under 35 U.S.C. § 102

The Examiner has rejected Claims 1, 2, 8, 9, 12, 13 and 16 under 35 U.S.C. § 102 (b) as being anticipated by Arslan et al. (Arslan) (U.S. Patent No.: 6,263,307). Although Applicants respectfully traverse these rejections, Claims 1, 8, 12, 13 and 16 have been amended to clarify the invention, and remove any ambiguities.

To clarify the instant invention and support the remarks submitted herein in reply to the Examiner's claim rejections, Applicants submit a brief summary of one the disclosed embodiments. Thus, the claimed voice feature extraction device provides a noise reduction system coefficient that is obtained by adding a surrounding signal inputted from the microphone and a specific simulated voice signal, executing an adaptive control to the added signals to thereby calculate a filter coefficient, and applying a fast Fourier transform to the filter coefficient to thereby calculate the power spectrum vector.

Further, the claimed voice extraction device samples a voice signal inputted from another microphone, executes a Fast Fourier transform to prevent generation of high frequency components of the input voice signal sampled, calculates a power spectrum vector of a power spectrum signal produced from the Fourier transformed input voice signal and then calculates the voice feature from the power spectrum vector via the noise reduction system that is set to the calculated noise reduction system coefficient.

The pending Claim 1 now recites that a voice feature extraction device comprises a noise reduction system coefficient calculation unit that adds a simulated

voice signal to a surrounding signal, and calculates a noise reduction system coefficient of a noise reduction system.

Applicants submit the amended Claim 1 is now distinguishable and patentable over the cited art, because Arslan is silent about a simulated voice signal being added to a surrounding signal in order to calculate a noise reduction system coefficient of a noise reduction system.

As stated by the Examiner, Arslan discloses that the noise reduction coefficients of an input voice signal are calculated in the previous frame and are stored in the preceding frame noise block of Figure 4 for use in the current frame calculation. Thus, in Arslan, the noise reduction coefficient calculation is executed on sequential frames of an input voice signal, only. As such, Arslan fails to disclose a noise reduction coefficient calculation that adds a simulated voice signal to a surrounding signal and does not include the input voice signal in this coefficient calculation.

In addition, Arslan discloses in Figure 2 that the filter coefficients are generated in noise filter block 208 (column 5, lines 65 – 66, Figure 1), and further that the filter coefficients in block 208 derive from estimates for the noise spectrum and the noisy speech spectrum of the frame (column 6, lines 3 – 5). Therefore, the filter coefficients are generated subsequent to the Fast Fourier Transform (FFT) module 204 in Figure 2 applied to the input voice signal, and also to the FFT module 902 as in Figures 9a and 9b, or simultaneously as in Figures 3, 4, and 5, where a time domain input voice signal is converted into a frequency domain signal. Thus Arslan calculates the noise filter coefficient from the input voice signal. In contrast, a noise reduction system coefficient calculation unit calculates Applicants' noise reduction system coefficient, from a simulated signal added to a surround signal. The noise reduction system is then set to the noise reduction coefficient and executes a noise reduction processing on a power spectrum vector.

Hence, for at least the above discussed reasons, Claim 1 is not anticipated by Arslan. Claim 2 is dependent on Claim 1 and is likewise not anticipated by Arslan.

Applicants also submit that amended Claim 8 is patentable over the prior art, because Arslan is silent about a simulated voice signal being added to a surrounding voice signal in order to calculate a noise reduction system coefficient of a noise reduction system, or that this calculation is executed without involving an input voice signal. As such, similarly to the above Claim 1 discussion, Applicants respectfully

submit that Claim 8 is not anticipated by Arslan. Claim 9 is dependent on Claim 8 and is likewise not anticipated by Arslan.

Further, Applicants submit that pending claim 12 is patentable over the prior art, because Arslan does not disclose the step of adding a simulated voice signal to a surrounding voice signal to calculate a noise reduction system coefficient of a noise reduction system or that this calculation is executed without involving an input voice signal. Hence, Claim 12 is not anticipated by Arslan. Claim 13 is dependent on Claim 12 and is likewise not anticipated by Arslan.

Still further, Applicants also submit that pending Claim 16 is patentable over the prior art, because Arslan does not disclose a step of adding a simulated voice signal to a surrounding voice signal to calculate a noise reduction system coefficient of a noise reduction system. As such, similarly to the above Claim 12 discussion, Applicants respectfully submit that Claim 16 is not anticipated by Arslan.

Accordingly, Applicants therefore respectfully request that the rejections of Claims 1, 2, 8, 9, 12, 13 and 16 under 35 U.S.C. § 102(b) be withdrawn.

Rejections under 35 U.S.C. § 103

The Examiner has next rejected Claims 3, 10, 14 and 17 under 35 U.S.C. § 103 (a) as being unpatentable over Arslan et al. (Arslan) (U.S. 6263,307) in view of Im et al. (Im) (US 5,805,696). Applicants respectfully traverse these rejections.

The amended Claim 3, dependent on Claim 2, recites that the filter coefficient calculation unit executes an adaptive control to a signal having the surrounding signal and the simulated voice signal added, and obtains a tap coefficient to thereby calculate the filter coefficient.

Applicants submit that pending Claim 3 is patentable over the prior art, because Arslan does not disclose the surrounding voice signal and the simulated voice signal being added to calculate a noise reduction system coefficient of a noise reduction system, of Claim 1 and Claim 2, and because Im teaches away from Claim 3. Im is directed to an echo cancellation adaptation technique. In Im, the training sequence generator generates a low level training sequence utilizing the a priori known signals so as to adapt an echo estimating filter in response to the low level training sequence. Thus, Im does not teach to suggest an adaptive filter applied to a signal having the surrounding

signal and the simulated voice signal added, to acquire a tap coefficient and to thereby calculate the filter coefficient.

In addition, in Im the adaptive filter receives a control signal combining incoming signals and a training signal is obtained as their algebraic difference rather than their algebraic sum. In regard to Im, an adder 28 provides to an adaptive estimating filter 20 a control signal equal to the algebraic difference between a training signal $P(z)$ and a resulting signal $T(z)$ of all incoming signals. In contrast, Applicants' filter coefficient calculation unit executes an adaptive control to added signals, namely an input voice signal and a simulated signal.

Hence, as shown in the above discussion of the 102(b) rejections, Arslan does not disclose all the limitations of Claims 1 and 2, and consequently fails to disclose the corresponding limitations of Claim 3. Further, Im also fails to teach an adaptive filter having the input voice signal and the simulated voice signal added as input. Consequently, the two prior art references may not be combined to reject Claim 3 under 35 U.S.C. 103(a).

Claims 10, 14, and 17 are, directly or indirectly, dependent on claims 8, 12, and 16, respectively. Since Arslan does not disclose all the limitations of Claims 8, 12, and 16, Arslan consequently fails to disclose the corresponding limitations of Claims 10, 14, and 17. Further, Claims 10, 14 and 17 include the feature of providing the signal addition of the input voice signal to the simulated voice signal as input to the adaptive filter. However, Applicants have shown in relation to Claim 3 that Im fails to teach this feature. Consequently, the Arslan and Im references may not be combined to reject Claims 10, 14, and 17 under 35 U.S.C. 103(a). Therefore, Applicants respectfully request that the rejections of Claims 3, 10, 14 and 17 be withdrawn.

The Examiner has further rejected Claims 5 - 7 under 35 U.S.C. §103 (a) as being unpatentable over Arslan et al. (Arslan) (U.S. 6,263,307) in view of LaRue (US 5,805,696). Applicants respectfully traverse these rejections.

Claims 5 - 7 are dependent on Claim 1. Applicants submit that although the Larue reference is directed to a voice feature extraction device applied to a vehicle navigational system, Arslan has been shown to fail to disclose all the limitations of Claim 1, so likewise Arslan fails to disclose the corresponding limitations of Claims 5 - 7. Therefore, Arslan may not be combined with LaRue to reject Claims 5 - 7 under 35

U.S.C. 103(a). Thus, Applicants respectfully request that the rejections of Claims 5 - 7 be withdrawn.

The Examiner has further rejected Claims 4, 11, 15 and 18 under 35 U.S.C. §103 (a) as being unpatentable over Arslan et al. (Arslan) (U.S. 6,263,307) in view of Im et al. (Im) (US 5,805,696) and further in view of Haykin et al. (Haykin) (U.S. 5,027,123). Applicants respectfully traverse these rejections.

Claims 4, 11 and 15 are either or indirectly dependent on Claims 3, 8 and 14, respectively. Arslan has been shown to fail to disclose all the limitations of Claims 3, 8 and 14, so likewise Arslan fails to disclose the corresponding limitations of Claims 4, 11 and 15. In addition, Im has been shown to fail disclose the limitations of Claims 3, 8 and 14, so likewise Im fails to disclose the corresponding limitations of Claims 4, 11 and 15. Applicants submit that in the Haykin reference, the specific gain adjustment is applied to both the Uhh(t) and the Dhh(t) signals instead of only the simulated signal as claimed in Claim 4, 11 and 15. Thus, Haykin fails to teach or disclose the corresponding features of Claims 4, 11 and 15. Therefore, Arslan, Im and Haykin may not be combined to reject Claims 4, 11, and 15 under 35 U.S.C. 103(a).

As for Claim 18, Applicants submit as amended Claim 18 to remove the ambiguity regarding the operation order of the filter coefficient calculation step and the FFT step. Thus, Claim 18 now recites that an adaptive filter executes an adaptive control on the basis of the signal added by the adder and the simulated voice signal delayed by the delay processing unit, and generates a filter coefficient; then an FFT operation unit that executes a fast Fourier transform to the filter coefficient generated by the adaptive control of the adaptive filter. In contrast, Arslan fails to disclose an FFT operation unit that executes a fast Fourier transform to a filter coefficient obtained by an adaptive control of the adaptive filter. As discussed above in relation to Claims 1 and 8, Arslan fails to teach the limitations of Claim 18. Further, as discussed above in relation to Claim 3, Im fails to teach an adaptive filter having the input voice signal and the simulated voice signal added as input. Still further, as discussed above in relation to Claims 4, 11 and 15, Haykin fails to teach that a specific gain adjustment is executed solely on the simulated voice signal. Therefore, Arslan, Im and Haykin may not be combined to reject Claim 18 under 35 U.S.C. 103(a).

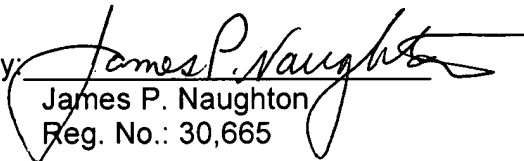
As such, Applicants respectfully request that the rejections of Claims 4, 11, 15 and 18 be withdrawn.

Conclusion

Applicants submit that this application is now in condition for allowance, and favorable reconsideration of this application in view of the above remarks is respectfully requested. If any fees are due, Applicant requests that this paper constitutes any necessary petition and authorizes the Commissioner to charge any underpayment, or credit any overpayment, to Deposit Account No. 23-1925.

If the examiner finds that there are any outstanding issues which may be resolved by a telephone interview, the Examiner is invited to contact the undersigned attorney at the below listed number.

Respectfully submitted,
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